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10/708,251

02/19/2004

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EXAMINER

AKRAM, IMRAN

ART UNIT

PAPER NUMBER

1795

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

|                              |                        |                     |  |
|------------------------------|------------------------|---------------------|--|
| <b>Office Action Summary</b> | <b>Application No.</b> | <b>Applicant(s)</b> |  |
|                              | 10/708,251             | PINGREE ET AL.      |  |
|                              | <b>Examiner</b>        | <b>Art Unit</b>     |  |
|                              | IMRAN AKRAM            | 1795                |  |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 26 February 2008.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-31 is/are pending in the application.
- 4a) Of the above claim(s) 1-13 and 27-31 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 14-26 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)          | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Response to Arguments***

1. Applicant's arguments with respect to claims 14-23 and 26 have been considered but are moot in view of the new ground(s) of rejection necessitated by amendment.

### ***Claim Rejections - 35 USC § 112***

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 25 and 26 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.
4. Claims 25 and 26 recite the limitation "the method of" in claim 22. There is insufficient antecedent basis for this limitation in the claim. Claim 22 is an apparatus claim.

### ***Claim Rejections - 35 USC § 102***

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 14, 15, 17, and 18 are rejected under 35 U.S.C. 102(b) as being anticipated by Gaisford (US 5,103,181).

Art Unit: 1795

7. Regarding claim 14, Gaisford discloses a material detection system, comprising: a processing chamber (see funnel of figure 11); a flow path in fluid communication with the processing chamber, wherein the medium of interest contains a solid material **36** to be detected; an electromagnetic energy source **35** coupled to the flow path for exciting said medium of interest (column 14, lines 14-24); and an impedance measuring device for measuring an impedance value of an electromagnetic circuit, said electromagnetic circuit including said flow path therein, wherein said impedance value corresponds to an amount of solid material within said medium of interest (column 1, lines 6-21). The flow path of Gaisford is capable of transporting a medium of interest to and from the processing chamber.

8. Regarding claim 15, Gaisford discloses that said electromagnetic circuit further comprises at least one of a microwave circuit and a radio frequency (RF) circuit (column 7, lines 33-41).

9. Regarding claim 17, Gaisford discloses that said impedance measuring device is configured to determine an impedance magnitude value and an impedance phase value (column 10, line 58 to column 11, line 3).

10. Regarding claim 18, Gaisford discloses a mechanism for determining variations of said impedance magnitude and phase values over time (column 27, lines 36-49).

### ***Claim Rejections - 35 USC § 103***

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

Art Unit: 1795

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

12. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148

USPQ 459 (1966), that are applied for establishing a background for determining

obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

13. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

14. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gaisford as applied to claim 14 above, and further in view of Quon (US 2004/0135590 A1)

15. While Gaisford discloses the details of claim 14, Gaisford does not disclose the energy source being configured to excite the medium of interest to plasma. Quon—in an invention disclosing impedance measuring for a plasma reactor system—discloses the excitation of gas into plasma via RF power (paragraph 6). Plasma is used for multiple

Art Unit: 1795

processes, such as the fabrication of substrates. Quon also discloses the use of impedance measuring for the plasma to ensure operation parameters (paragraph 10). It would have been obvious to one having ordinary skill in the art at the time of invention to excite the medium of interest of Gaisford to a plasma as in Quon were the express purpose of the material any suitable process for which plasma is used. The impedance measuring of Gaisford would be appropriate in determining purity of the plasma—an essential element in any process.

16. Claims 19, 20, and 22-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Beaudry (US 3,569,777) in view of Gaisford.

17. Regarding claim 19, Beaudry discloses a plasma based semiconductor material removal system, comprising: an electromagnetic energy source configured to cause excitation of a gas (column 1, lines 4-7) having reactive species therein (column 1, lines 8-14), wherein the excited gas may include a solid material (column 1, lines 58-60); a mechanism **19** for uniformly conveying the excited gas (column 1, lines 17-36); and an impedance measuring device for measuring an impedance value of an electromagnetic circuit, said electromagnetic circuit including said excited gas therein (column 1, lines 35-60). Beaudry does not, however, disclose said impedance value corresponding to an amount of solid material within said gas. Gaisford, however, in an invention that's analogousness has already been establish above, discloses that said impedance value corresponds to an amount of solid material within said medium of interest (column 1, lines 6-21). Monitoring the composition of the mediums of interest is of utmost importance in any process as disclosed by Gaisford (column 1, lines 22-43). It would

Art Unit: 1795

have been obvious to one having ordinary skill in the art at the time of invention to use the impedance means already disclosed in Beaudry to detect the mediums of interest as in Gaisford to ensure compositions and concentrations that are desired for the reaction.

18. Regarding claim 20, Beaudry discloses that said electromagnetic circuit further comprises at least one of a microwave circuit and a radio frequency (RF) circuit (column 2, lines 37-57).

19. Regarding claim 22, Beaudry discloses that said impedance measuring device is configured to determine an impedance magnitude value and an impedance phase value (column 3, lines 42-55).

20. Regarding claim 23, Beaudry discloses a mechanism for determining variations of said impedance magnitude and phase values over time (column 3, lines 55-73).

21. Regarding claims 24 and 25, Beaudry discloses that said downstream electromagnetic energy source is configured to apply power at a power level of about 300 watts (W) (column 5, lines 4-6).

22. Regarding claim 26, Beaudry discloses that said impedance measuring device is configured for facilitating endpoint detection of removal of said photoresist material (column 1, lines 8-34).

23. Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Beaudry and Gaisford as applied to claim 19 above, and further in view of Mills (US 2004/0118348 A1).

Art Unit: 1795

24. Regarding claim 21, while Beaudry disclose the excitation of gas into a plasma using radio frequency energy (column 1, lines 15-22) neither Beaudry not Gaisford discloses that said downstream electromagnetic energy source is configured to excite said medium of interest into a microwave plasma. Microwave energy—as is commonly known in the art—is simply a higher energy form of energy than radio frequency energy. Mills—in an invention relating to impedance matching of plasma—discloses the interchangeability of these two forms of energy (paragraph 374). While Mills discloses use of RF in lieu of microwave power, it would have been obvious to one having ordinary skill in the art at the time of invention to use the microwave power of Mills in the invention of Beaudry and Gaisford if more energy was needed than what radio frequency provides to excite the gas into a plasma--thereby turning the plasma into a microwave plasma.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to IMRAN AKRAM whose telephone number is (571)270-3241. The examiner can normally be reached on 10-7 Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Alexa Neckel can be reached on 571-272-1446. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.



Art Unit: 1795

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

IA

/Alexa D. Neckel/  
Supervisory Patent Examiner, Art Unit 1795